FEDERAL REPUBLIC OF GERMANY

GERMAN PATENT OFFICE

PATENT NO. DE 30 07 104 A 1

(Offenlegungsschrift)

Int. Cl.^{3}:	B 65 G 47/68
Application:	P 30 07 104.6
Application Date:	February 26, 1980
Publication Date:	September 10, 1981

TRANSPORT DEVICE FOR UPRIGHT STANDING VESSELS

Applicant:	Kronseder, Hermann 8404 Wörth, DE
Inventor:	Kronseder, Hermann 8404 Wörth, DE
	Beer, Gottfried 8411 Nittendorf, DE

Hermann Kronseder
Wörth/Donau

pat-ha-pe
February 21, 1980
3007104

Claims

1. Transport device for upright standing vessels, particularly bottles, with a single-row feed device, at least two laterally connected consecutive single-row discharge devices, and with push elements, which transfer the vessels from the pockets of the feed device into pockets of the discharge device, and which elements rotate in synchronicity with the feed device, characterized in that all the push elements (38) are arranged in a manner so that they can be moved substantially transversely with respect to the path of movement of a common carrier device, on said common carrier device (32) which, in the area of the discharge device (21, 22), rotates parallel to the feed device (18), and where the push elements are connected to a control device (42, 43) for their transverse movement.

2. Transport device according to Claim 1, characterized in that the common carrier device (32) can be driven at a conveyance velocity which is different from that of the feed device (18), in such a manner that each push element (38) is shifted as it moves between two discharge devices (21, 22) with respect to the feed device (18) by at least one pocket interval.

3. Transport device according to Claim 2, characterized in that the common carrier device (32) can be driven in such a manner that each push element (38) as it moves between two successive discharge devices (21, 22) is shifted with respect to the feed device (18) by one pocket interval.

4. Transport device according to Claim 2 or 3, characterized in that the common carrier device (32) can be driven at a conveyance velocity which is lower than that of the feed device

(18), in such a manner that each push element (38) as it moves between two discharge devices (21, 22) is delayed with respect to the feed device (18) by at least one pocket interval.

5. Transport device according to one of Claims 1-4, whose feed device presents a continual pulling means, which is equipped with drive pins for the vessels, and which rotates on two deflection wheels, characterized in that the common carrier device for the push elements (38) also presents a continual pulling means (32), which rotates on two deflection wheels (33, 34) whose strand which runs parallel with respect to the strand of the feed device (18), which runs in the conveyance direction.

6. Transport device according to Claim 5, characterized in that the continual pulling means (4) of the feed devices (18) rotate in a horizontal plane and the continual traction means (32) of the common carrier device in a vertical plane.

7. Transport device according to one of Claims 5 or 6, characterized in that the continual pulling means of the carrier device is formed by two roller chains (32) which are arranged at an interval from each other and parallel to each other.

8. Transport device according to Claim 7, characterized in that each push element (38) is attached in a manner so it can be shifted to two rods (41), which are arranged between the two roller chains (32) at a right angle with respect to the latter and connected at their ends to the roller chains.

9. Transport device according to one of Claims 5-8, characterized in that each traction element (38) is shaped in the form of a fork and grabs the pulling means (4) of the feed device.

10. Transport device according to one of Claims 1-9, characterized in that the control device for the transverse movement of the push elements (38) presents at least one fixed control cam (43) and cam rollers (42) which engage in the control cam and are connected with the push elements (38).

11. Transport device according to Claim 10 and one of Claims 2-4, characterized in that a single control cam (43) is provided, in which the cam rollers (42) of all the push elements (38) engage.

12. Transport device according to one of Claims 1-11, characterized in that the discharge devices (21, 22, 23) are formed by star wheels (24), which mesh directly with the pockets (15) of the feed device (18), where the pockets (25) of the star wheels can be controlled in the circumferential direction of the star wheel in such a manner that they present, in the area of the feed device (18), at least approximately the conveyance velocity of the latter, and are then decelerated.

13. Transport device according to Claim 12, characterized in that a conveyor belt (27) in each case follows tangentially after each star wheel (24), and in that the conveyor belts (27), which run parallel to each other and directly next to each other, combine to form a single multiple-row conveyor.

14. Transport device according to Claim 13, characterized in that the rotation axes (26) of the star wheels (24) are located on a common straight line, and the conveyor belts (27) run at an acute angle with respect to the straight line.

15. Transport device according to one of Claims 1-14, characterized in that the feed device (18) is connected directly after the circumferential table (20) of a vessel treatment machine (3).

Hermann Kronseder
Wörth/Donau

pat-ha-pe

February 21, 1980

3007104

TRANSPORT DEVICE FOR UPRIGHT STANDING VESSELS

The invention relates to a transport device according to the preamble of Claim 1.

Such a transport device is already known, in which each one of a total of three discharge devices is associated with its own synchronously driven rotor with nose-shaped push elements, where the feed device is designed as a drive chain. The push elements, which are rigidly arranged on the rotor, during their rotation necessarily enter into the straight-line path of movement of the drive chain and, in the process, they completely push the vessels concerned out of the pockets, which are formed by the drive pins, after which the vessels are grabbed by the pockets of the discharge devices, each of which is designed as a star wheel. In this known transport device, as a result of the compulsorily determined movement path of the traction elements which rotate on a circular path, the movement of the vessels is very abrupt during the transfer from the feed device to the discharge device, where the vessels are temporarily without any precise guidance. The risk of breaking and the sound emission are accordingly high, and fast transport speeds are impossible.

The invention is based on the problem of providing, in a transport device of the type mentioned above, a gentle and precise transfer of the vessels between the feed device and the discharge device, and consequently to allow a breakdown-free operation with low noise level and high output rates.

This problem is solved according to the invention by the characteristics indicated in the characterizing portion of Claim 1.

In a transport device according to the invention, the desired optimal movement course for the vessels in the transfer area can be achieved by means of appropriate controls of the transverse movement of the push elements which are attached in a manner which allows movement on the carrier device. Because the carrier device runs parallel to the feed device, the pushing devices can remain in contact with the vessel for a very long time, so that the vessels are guided with precision at all times, until they sit completely in the pockets of the discharge device. As a result, even at high output rates, it is possible to transfer the vessels without abrupt movements and gently. In addition, the construction is relatively simple, because only a single carrier device is required for the pushing devices which act on several discharge devices.

The costs required for the construction can be kept particularly low without negative effect on the function, if, according to a variant of the invention, the common carrier device can be driven at a conveyance velocity which is different from that of the feed device, in such a manner that each push element during its movement between two discharge devices is shifted by at least one pocket interval with respect to the feed device. In this case it is not necessary for each pocket, out of which a vessel is pushed, to have its own pushing device which acts in each case only on a certain discharge device, rather the pushing device acts successively on each desired discharge device. Consequently, the number of pushing devices can be reduced considerably.

In this connection, it is particularly advantageous, if, according to a variant of the invention, the common carrier device can be driven at a lower conveyance velocity than the feed device, in such a manner that each push element, as it moves between two discharge devices, is delayed by at least one pocket interval with respect to the feed device. As a result, the velocity of the pushing devices is automatically adjusted to the vessel velocity, because, as a vessel is pushed out or transported further in the discharge device, the velocity component which acts in the transport direction of the feed device is usually reduced.

Another advantageous variant of the invention consists of the use of discharge devices that are formed directly from the star wheels which directly mesh with the pockets of the feed device, where the pockets of the star wheel can be controlled in the direction of rotation of the star wheel in such a manner that, in the area of the feed device, they present at least approximately the conveyance velocity of the latter and are subsequently decelerated. In connection with a gentle transfer of the vessels by the controllable push elements, a reliable subdivision of a rapidly moving row of vessels into several moving rows of vessels can be achieved, even at high output rates, without the vessels locking against each other, and thus with a low level of sound emission, particularly in the case where, according to a variant of the invention, a conveyor belt tangentially follows each star wheel, and conveyor belts, which run parallel to each other and immediately next to each other, combine to form a single multiple-row discharge device.

Such a transport device is ideally suited to achieve a low-noise reduction of the transport velocities in the discharge of a rapidly moving vessel treatment machine, using the shortest path and at relatively low cost.

According to a variant of the invention, the feeder device is therefore connected immediately after the rotating table of a vessel treatment machine. The table can be, for example, the bottle table of a labeling machine, from which the bottles are transferred directly into the pockets of the feed device, which is preferably equipped with a continual pulling means. The feed device thus can replace the discharge star.

An embodiment example is described with reference to the drawings below to explain the invention in greater detail. In the drawing:

Figure 1 shows the top view of a transport device, and

Figure 2 shows the section AB according to Figure 1 with the push element completely pulled out.

The transport device 1 according to Figures 1 and 2 is used for the subdivision of a rapidly running row of upright standing bottles (2) into several slowly running rows in the discharge of a labeling machine 3. It presents a pulling means, which rotates in a horizontal plane, and is in the form of a toothed belt 4, which is fitted on its smooth external side with a wedge-like drive pin 5 and on its toothed inner side with counterholders 6. The drive pins 5 and the counterholders 6 are connected to each other by screws and to the toothed belt 4. The latter runs over two corresponding toothed deflection wheels 7, 8, which are provided with recesses – not shown – for the counterholders 6, where the deflection wheels have different diameters. The deflection wheel 7 with the larger diameter is attached on the shaft 9 of the discharge star 10 of the labeling machine 3 and it is driven by the latter in the direction of the arrow. The deflection wheel 8 with the smaller diameter rotates freely in a frame 12 of the transport device 1, to which it is attached, and which is blocked with the housing 11 of the labeling machine 3.

In the portions that run along a straight line between the deflection wheel 7, 8, the toothed belts and the counterholders 6, respectively, are each guided with regard to height and laterally by a rail 13 having a C-shaped cross section. In addition, on the circumference of the toothed belt 4, a fixed railing 14 is provided, which holds the bottles (2) in the pockets 15, which are formed by the drive pins 5. The bottles here initially stand on a fixed slideway 16 and then on a conveyor belt 17 which rotates in the direction of the arrow. The toothed belt 4, with the drive pins 5 and the counterholders 6, the two deflection wheels 7 and 8 and the rails 13, forms the feed device 18 of the transport device 1, which takes over the bottles directly from the rotating table 20 of the labeling machine, with the cooperation of the discharge arc 19 of the labeling machine 3, and if necessary, the discharge star 10.

On the single-row feed device 18, three single-row discharge devices 21, 22, 23 are connected laterally, one after the other, in a straight-line area between the deflection wheels 7 and 8 on the side of the conveyor belt 17. Each one of the three discharge devices 21, 22, 23 presents a star wheel 24 with pockets 25, which can be controlled in the so called circumferential direction, which wheel is attached to a vertical shaft 26 attached to the frame 12. The control of the pockets 25, which can be swiveled opposite the star wheel 24, is carried out in the conventional manner, for example, by means of a fixed groove cam, which is not shown, into which the roller levers – also not shown – which are connected to the pockets 25, engage, in such a manner that the pockets 25, in the area of the feed device 18, temporarily present the same transport velocity and then are decelerated to a substantially smaller transport velocity, so that the bottles 2 are moved in relatively close contact. In the process, the pockets 25 of the

discharge device 21, 22, 23 mesh directly with the pockets 15 of the feed device 18, which means that each bottle 2 temporarily sits simultaneously in a pocket 15 and in a pocket 25. The discharge devices 21, 22, 23, moreover, are arranged in such a manner that they mesh simultaneously with each third pocket 15 of the feed device 18, in each case mutually offset by one pocket 15, so that the first discharge device 21 grabs from successive groups of three bottles 2 every first bottle, while the second discharge device 22 grabs every second bottle, and the third discharge device 23 every third bottle. Accordingly, the mutual separation of the discharge devices and their engagement places, respectively, on the feed device 18, in each case is exactly eight pocket intervals of the feed device that is eight times the separation between two adjacent pocket centers of the feed device 18. In the area of the decelerated transport velocity of the pockets 27, a corresponding slowly driven conveyor belt 25 follows tangentially with respect to each star wheel 24, where the bottles 2 in the area between the feed device 18 and the conveyor belts 27, are held by guide plates 28, 29, 30 in the pockets 25 of the discharge device. The guide plate 30 behind the last discharge device 23 extends over the toothed belt 4 and it leads the bottles 2 of the pockets 15. The two guide plates 28 and 29, which sit between the discharge devices, also hold the bottles 2 in the pockets 15 on the feed device 18, and, moreover, they temporarily lead the bottles 2, which come out of the second and the third discharge device 22, 23 with the conveyor belts 27, until they are combined with the bottles that come out of the first discharge device 21 on the corresponding conveyor belt 27 to form single multiple-row bottle flow. For this purpose, the conveyors 27 run parallel to each other and immediately adjacent to each other and they form an acute angle with the connection lines of the three-star wheel shaft 26 and with the strand of the toothed belt 4 which runs past the star wheels 24. The lateral guidance

of the multiple-row bottle flow on the conveyor belts 27 occurs by means of railings 31, which are connected to the first and last discharge devices, 21 and 23, respectively.

Below the rotation plane of the toothed belt 4, opposite the first and second discharge device 21, 22, a flexible pulling means is provided, which rotates in a vertical plane, and which is in the form of two roller chains 32 that are parallel to each other with separation. The two roller chains 32 each run over two toothed deflection wheels 33, 34, which are attached rotatably by means of two shafts 35, 36 in the frame 12. In the straight-line area between the deflection wheels 33, 34, the roller chains 32 are formed with guide ridges and guide grooves, which are formed on a fixed cam plate 37, with sidewise and heightwise precision. The pulling means which is formed by the roller chains 32 functions as a carrier device for a number of fork-shaped push elements 38, which are provided at their free ends with elastic cushions 39. The separation of the free ends of each push element 38 is greater than the height of the rails 13 of the feed device 18. Each push element 38 is attached to a block 40, which is attached in a manner which allows shifting on two rods 41, which are at a right angle with respect to the roller chains 32. The rods 41 connect the two roller chains 32 and they are attached at their adjacent ends in each case to a common chain member, so that they do not change their relative position during the rotation of the roller chains 32. On each block 40, on the side opposite the pushing device 38, a cam roller 42 is attached, which engages in a groove cam 43, which is formed on the bottom side of the cam plate 37, which is attached to the frame 12. This groove cam 43, together with the cam rollers 42, forms the control device for the transverse movement of the push elements 38 with respect to their carrier device that is opposite the roller chains 32. The latter are arranged in such a manner that their bottom strand, in the area of the first and second discharge device 21 and 22, runs exactly parallel to the feed device 18, in such a manner that the free ends of each

push element 38 are located below or above the toothed belt 4, respectively, as shown in Figure 2.

The division of the push elements 38 on their carrier device 32 is a two two-thirds subdivision of the pockets 15 of the feed device 18. The separation of four consecutive push elements 38 is thus exactly eight pocket intervals. This is precisely the separation between the first and the second discharge device 21 and 22. The roller chains 32 are driven by means of a chain connection 44 by a miter gear 45, which sits on the shaft 9 of the discharge star 10, synchronously with respect to the discharge device 18 at a transport velocity which is slightly smaller, in such a manner that each push element 38, during its movement from the first discharge device 21 to the second discharge device 22 is delayed by one pocket interval with respect to the feed device 18. This means that each push element 38, travels a distance of eight pocket intervals, while the discharge device 18 is moved over nine pocket intervals. The velocities vary accordingly. In addition, the arrangement is such that the push element 38 meshes with pockets 25 of the star wheels 24 in the area of the first and second discharge device.

The groove cam 43 is designed in such a manner that each one of the push elements, which is normally in the starting position with retraction from the discharge device 18, after it has passed the deflections wheels 34, is gradually moved in the area of the first discharge device 21, onto the later, and, in the process, it gently pushes the first bottle 2 of a group of three into the pocket 25 of the first discharge device 21, which pocket advances at a corresponding higher velocity, and it maintains the bottle in said pocket until the bottle 2 has reached the guide plate 28. The push element 38 is then slightly retracted to the back of the pockets 15 of the feed device 18, and it runs in the same direction as the latter feed device until it reaches the second discharge device 22, where, as a result of the lagging it now comes in contact with the second

bottle of the group of three, transferring it again gently into the passing pocket 25 of the second discharge device 22. Then, each push element 34 is retracted into its starting position and in this manner it passes by the direction wheels 33. The third bottle of each group of three is transferred by the guide plate 30 into the pockets 25 of the third discharge device 23.

To ensure a precise synchronous run of all of the transport elements, it is advantageous to drive the star wheels 24 of the three discharge devices 21, 22, 23 and the conveyor belt 17 under the discharge device 18 by means of a schematically drawn driving train 46, as the discharge device 18 is driven by the miter gear 45, in the direction of the arrow.

Nummer: 30 07 104
Int. Cl.³: B 65 G 47/68
Anmeldetag: 26. Februar 1980
Offenlegungstag: 10. September 1981

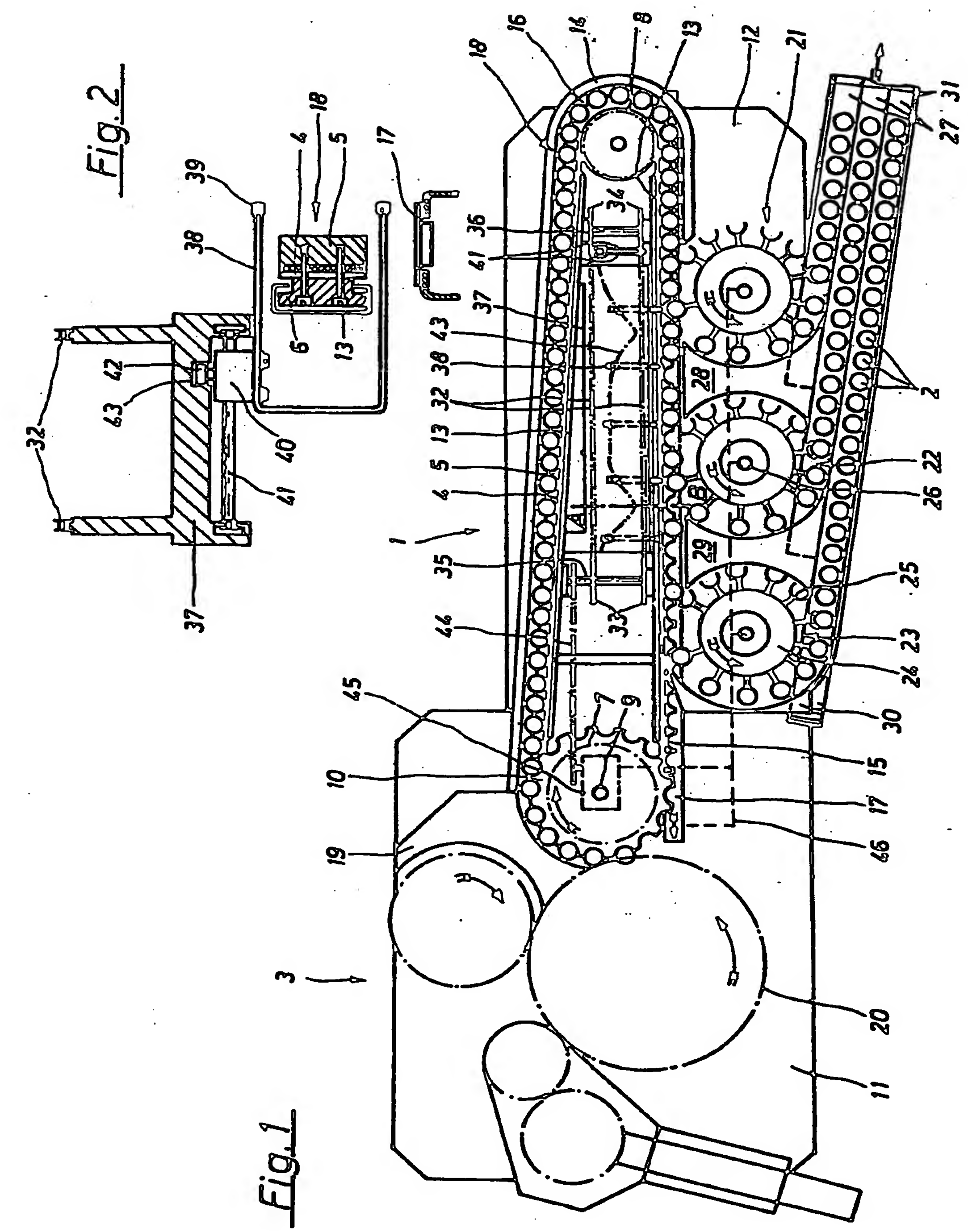

Fig. 1

Fig. 2